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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
09/520,684	03/07/2000	Jonathan S. Turner	27776	9090

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THE LAW OFFICE OF KIRK D. WILLIAMS
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EXAMINER

VOLPER, THOMAS E

ART UNIT	PAPER NUMBER
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2697

DATE MAILED: 09/09/2003

9

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary

Application No.

09/520,684

Applicant(s)

TURNER ET AL.

Examiner

Thomas Volper

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-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If the period for reply specified above is less than thirty (30) days, a reply within the statutory minimum of thirty (30) days will be considered timely.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133).
- Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☐ Responsive to communication(s) filed on ____.
- 2a) ☒ This action is **FINAL**. 2b) ☐ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-16 and 19-33 is/are pending in the application.
- 4a) Of the above claim(s) ____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) ____ is/are allowed.
- 6) ☒ Claim(s) 1-16 and 19-33 is/are rejected.
- 7) ☐ Claim(s) ____ is/are objected to.
- 8) ☐ Claim(s) ____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☐ The drawing(s) filed on ____ is/are: a) ☐ accepted or b) ☐ objected to by the Examiner.
- Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
- 11) ☐ The proposed drawing correction filed on ____ is: a) ☐ approved b) ☐ disapproved by the Examiner.
- If approved, corrected drawings are required in reply to this Office action.
- 12) ☐ The oath or declaration is objected to by the Examiner.

Priority under 35 U.S.C. §§ 119 and 120

- 13) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. ____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.
- 14) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. § 119(e) (to a provisional application).
- a) ☐ The translation of the foreign language provisional application has been received.
- 15) ☐ Acknowledgment is made of a claim for domestic priority under 35 U.S.C. §§ 120 and/or 121.

Attachment(s)

- 1) ☐ Notice of References Cited (PTO-892)
- 2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
- 3) ☐ Information Disclosure Statement(s) (PTO-1449) Paper No(s) ____.
- 4) ☐ Interview Summary (PTO-413) Paper No(s). ____.
- 5) ☐ Notice of Informal Patent Application (PTO-152)
- 6) ☐ Other: ____.

DETAILED ACTION

Response to Arguments

1. Applicant's arguments filed 26 June 2003 have been fully considered but they are not persuasive.

In reference to Applicants' arguments regarding claims 1, 5, 11 and 19 that Fan (US 5,337,308) fails to teach "how to determine when no additional packets received at a given switch element input will have a source timestamp value earlier than a specified value" or "how to sense when no subsequent packets which enter each of the plurality of arrival buffers will have a source timestamp having a value earlier than a specified value" or "control logic to recognize when no future packets received at the set of arrival buffers will indicate a source timestamp value earlier than a predetermined value," the Examiner respectfully disagrees. It is the Examiner's position that Fan, col. 6, lines 15-40, anticipates the aforementioned limitations. Specifically, Fan discloses a minimum time-stamp (TS) value detector (34) that is connected to all input buffers to examine cells and determine the cell, or cells, with the earliest timestamp value. The cell with the earliest timestamp is launched into a self-routing switch (32). The cells are delivered in proper sequence. Since each cell is stamped upon entering the switch at timestamp stage (10) (col. 4, lines 52-62), and the cell with the earliest timestamp is chosen to be sent through the switch as described above, no subsequent cell that is sent through the switch can have an earlier timestamp than a cell that has already been sent.

In reference to Applicants' arguments regarding claim 12 that Fan (US 5,337,308), Holden (US 5,570,348) and Toy et al. (US 4,630,260) neither alone or in combination suggest a

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“departure status message indicating an earliest source timestamp value of any data packet that might be subsequently transmitted to the second preselected downstream neighbor element,” the Examiner respectfully disagrees. Fan discloses that a reference time stamp (RT) cell generator (37) generates an idle RT cell based on the minimum time stamp value detected by detector (34) (col. 6, lines 40-56). Each cell is stamped at the timestamp stage (10) upon entering the switch (col. 4, lines 52-62), and only cells with the earliest time stamp value are forwarded to the next stage. Since the RT cell contains a timestamp with the earliest timestamp value, no subsequent cell that is sent through the switch can have an earlier timestamp than a cell that has already been sent. Thus, the RT cell represents the status message of the present invention because no cell that enters the first switching stage will have a time stamp value earlier than this RT cell.

Applicants' arguments fail to overcome the 35 U.S.C. 102(b) rejections of claims 1, 5, 11 and 19 as being anticipated by Fan (US 5,337,308). In addition, claim 12 is rejected on new grounds under 35 U.S.C. 103(a) as being unpatentable over Fan (US 5,337,308) in view of Toy et al. (US 4,630,260) and Holden (US 5,570,348), as necessitated by Amendment. For the reasons stated above, this action is deemed final.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 28, 31 and 33 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

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4. Claim 28 recites the limitation "the current cell time" in line 11. There is insufficient antecedent basis for this limitation in the claim.
5. Claim 31 recites the limitation "the particular data packet" in lines 1-2. There is insufficient antecedent basis for this limitation in the claim.
6. Claim 33 recites the limitation "the particular data packet" in line 9. There is insufficient antecedent basis for this limitation in the claim.
7. Claim 33 recites the limitation "the current cell time" in line 9. There is insufficient antecedent basis for this limitation in the claim.

Claim Rejections - 35 USC § 102

8. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

9. Claims 1-5, 7, 9, 11, 19, 20 and 24-33 are rejected under 35 U.S.C. 102(b) as being anticipated by Fan (US 5,337,308).

Regarding claims 1, 5, 11 and 19, Fan discloses a multi-stage switching system that uses sequence control. Packets or cells arriving at the switching system enter the time stamp stage (10) where they are stamped to indicate the time of arrival to establish cell sequence (col. 4, lines 58-62). The time-stamped cells enter the input buffers (31) of the second stage, where a minimum time stamp detector (34) is arranged to examine the time stamp values of cells in all of the input buffers and to determine the earliest value. The cells with the earliest values are

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supplied to a selector (35) that selects a cell and admits it to the self-routing switch (32) according to a destination address of the desired output buffer (col. 6, lines 15-40). The minimum time stamp detector (34) and the selector (35) represent the control logic of the present invention. Fan also discloses that a reference time stamp (RT) cell generator (37) generates an idle RT cell based on the minimum time stamp value detected by detector (34). This RT cell is supplied to an output link of the switching module (16) to be used by the third stage as a reference (latest) time stamp value (col. 6, lines 47-54). The third stage operates much the same way as the second stage, and uses this reference time stamp value, which represents the "derived information" of claim 1 and the "specified value" of claim 5 of the present invention, to select packets in sequence.

Regarding claim 2, see paragraph regarding claim 1 above. The cells are time stamped to indicating the time of arrival at the switching system. They are then routed through the switching system to maintain this sequence.

Regarding claim 3, the RT cell mentioned in the paragraph regarding claim 1 provides the status message that establishes a lower bound. This RT cell is used in the third stage to select the packets with the earliest time stamps, according to the method described for the second stage.

Regarding claim 4, see paragraph regarding claim 2 above.

Regarding claims 7 and 20, Fan discloses that cells launched into self-routing switch (32) are routed according to their destination address to a desired output buffer (col. 6, lines 36-40).

Regarding claim 9, see paragraph regarding claim 1 above. The RT cell is sent from a switch module in the second stage to a switch module in the third stage.

Regarding claims 24, 26-29, 31-33, Fan discloses a multi-stage switching system

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that uses sequence control. Packets or cells arriving at the switching system enter the time stamp stage (10) where they are stamped to indicate the time of arrival to establish cell sequence (col. 4, lines 58-62). Fan also discloses that a reference time stamp (RT) cell generator (37) generates an idle RT cell, which represents the floor indication of the present invention, based on the minimum time stamp value detected by detector (34). A comparator (45) compares the time stamp values of data cells with the reference time stamp value of RT cells. If the time stamp value of a data cell is equal to or smaller than the reference time stamp value, then the data cell is selected to be delivered to the output link. If the data cell time stamp is greater than the reference time stamp value, then the RT cell is selected for delivery (col. 7, line 66 – col. 8, line 6). If the RT cell is selected, it is equivalent to discontinuing forwarding of a data packet during a current cell time, as in the present invention. The first stage includes an empty buffer detector (22) that detects empty output buffers of the first stage and informs RT cell generator of a “no cell condition” and supplies an RT cell, i.e. status message, to the output link (col. 5, lines 47-55). This cell is transmitted to the input buffers of the second stage, thus meeting the limitation of creating a new floor indication at the arrival buffers.

Regarding claims 25 and 30, Fan discloses that the process of selecting a cell based on earliest time stamp value occurs N times during a cell transfer time (col. 6, lines 25-39). Thus, it is possible for one RT cell to be sent, which is equivalent to discontinuing data cell forwarding, and for one data cell to be forwarded within one cell transfer time.

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Claim Rejections - 35 USC § 103

10. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

11. Claims 6, 8 and 21-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (US 5,337,308) as applied to claims 1-5, 7, 9, 11, 19, 20 and 24-33 above, and further in view of Holden (US 5,570,348).

Regarding claims 6, 21 and 22, Fan fails to disclose that the input buffers and output buffers of the switching element are operative to accept data packets of different priority classes. Holden discloses a switching system in which each switch element (40) asserts backpressure signals to each connection to each of its input interfaces on a per-input, per-priority basis (col. 8, lines 1-12). Each switch element also contains a multipriority buffer pool controller (MPBPC) (150) that controls the overall function of the switch element (40). Thus, the switch elements are able to handle different priority levels of data. At the time the invention was made, one of ordinary skill in the art would have been motivated to allow each switch element of the switching system of Fan to handle different priority levels of traffic in order to make it compatible with ATM traffic, which often uses different classes such as CBR, VBR and ABR that have different priorities when being routed through a switching system.

Regarding claim 8, the backpressure signal mentioned in the previous paragraph regarding claims 6, 21 and 22 meets the limitation of postponing reception of data packets. This

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prevents cell loss at an input interface to a switch element that has no available cell memory (col. 7, lines 60-67).

Regarding claim 23, Fan does not disclose transmitting a packet prior to another packet based on priority, even if it has a later timestamp. Holden discloses that the high priority traffic is impeded last as the available memory in a switch element decreases. The thresholds are set so that high priority traffic has strict priority over lower priority traffic (col. 9, lines 3-7). This implies that a higher priority packet would be sent before a lower priority packet. At the time the invention was made, one of ordinary skill in the art would have been motivated to implement priority based service precedence over time stamp order in the switching system of Fan. One of ordinary skill in the art would have been motivated to do this if CBR and ABR traffic were using the same switching network. CBR traffic has a guarantee associated with it, and according to ATM standards CBR traffic would be given service precedence regardless of time stamp age if it were in contention with ABR traffic at the same switch element.

12. Claim 10 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (US 5,337,308) in view of Toy et al. (US 4,630,260).

Regarding claim 10, Fan discloses all the limitations of claim 5, upon which claim 10 depends. Fan also discloses that the RT cells are transmitted on the same paths as the data packets, which is evident in the 102(b) rejection above. The RT cells contain information necessary for controlling the sequence of data packets, thus they represent control packets. Fan does not disclose that the switching element includes first and second groups of arrival and departure buffers. Toy discloses a switching system in which the switch elements comprise two

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incoming links and two outgoing links. Each of these links further comprises two sublinks (col. 5, lines 5-12; see also Fig. 7). At the time the invention was made, a person of ordinary skill in the art would have been motivated to implement this structure in the switching system of Fan in order to provide multipath capability through the network.

13. Claims 12 and 14-16 are rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (US 5,337,308) in view of Toy et al. (US 4,630,260) and Holden (US 5,570,348).

Regarding claims 12 and 15, Fan discloses a multi-stage switching system that uses sequence control. Packets or cells arriving at the switching system enter the time stamp stage (10) where they are stamped to indicate the time of arrival to establish cell sequence (col. 4, lines 58-62). Fan also discloses that a reference time stamp (RT) cell generator (37) generates an idle RT cell, which represents the status message of the present invention, based on the minimum time stamp value detected by detector (34). The time-stamped cells enter the input buffers (31) of the second stage, where a minimum time stamp detector (34) is arranged to examine the time stamp values of cells in all of the input buffers and to determine the earliest value. The cells stored in the foremost locations of the input buffers (31) represent the "candidate packets" of the present invention. The cells having the minimum time stamp values as determined by the minimum time stamp value detector (34), i.e. which represent the set of these candidate cells, are provided to the selector (35) that selects the cells in order of increasing time stamp value to be outputted to the self-routing switch (32) according to a destination address of the desired output buffer (col. 6, lines 15-40). The first stage includes an empty buffer detector (22) that detects empty output buffers of the first stage and informs RT cell generator of a "no cell condition" and

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supplies an RT cell, i.e. status message, to the output link (col. 5, lines 47-55). This cell is transmitted to the input buffers of the second stage, thus meeting the limitation of creating a new status message at the arrival buffers. Fan discloses sending either a data packet to a downstream element or a status message indicating the earliest source timestamp value to a downstream element as described above. Fan fails to expressly disclose sending either a data packet or status message after receiving a grant signal from a downstream element, or sending a grant signal to an upstream element. Toy discloses a switching system wherein upon receipt of a packet at the input control (703) of a switch node (201-3) a request signal is sent to an arbiter (735), which relays the signal to the output interfaces (736 and 737). Once one of the output interfaces responds with a grant signal, the arbiter relays this grant signal back to input control which commences transfer of the packet (col. 6, lines 18-38). Holden discloses a backpressure signal transmitted from one switch element to an upstream switch element to halt sending of packets in the case of a full cell memory at an input interface. Although Toy discloses sending grant messages from output to input inside a switch element, it would have been obvious to send grant messages from an input of one switch element to an output of an upstream switch element. Holden provides the motivation for transmitting flow control type signals between switch elements. At the time the invention was made, it would have been obvious to a person of ordinary skill in the art to transmit a grant signal from a downstream element to an upstream element prior to sending a packet or status message, embodied by the RT cell of Fan. One of ordinary skill in the art would have been motivated to do this in order to eliminate cell loss by allowing an upstream element to send a packet or status message only when the downstream element had enough room in its input buffers.

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Regarding claim 14, Fan discloses that cells launched into self-routing switch (32) are routed according to their destination address to a desired output buffer (col. 6, lines 36-40).

Regarding claim 16, Fan does not disclose transmitting either a departure data packet or a departure status message to a plurality of downstream switch elements. Holden discloses multicasting within each switch element. An array of multicast group bits represents the output ports to a switch element. Any bits that are set in the selected word within a multicast group correspond to the switch element outputs in which the cell is to be placed (col. 12, lines 28-38). At the time the invention was made, one of ordinary skill in the art would have been motivated to include this multicast feature in the switching system of Fan to use the system in a video conference whereby several workstations are connected by a switch fabric and voice and image data are transmitted from each workstation to each of the other workstations.

14. Claim 13 is rejected under 35 U.S.C. 103(a) as being unpatentable over Fan (US 5,337,308) in view of Toy et al. (US 4,630,260) and Holden (US 5,570,348) as applied to claims 12 and 14-16 above, and in further view of Abali et al. (US 5,721,820).

Regarding claim 13, Fan discloses all of the limitations of claim 13 except that the departure buffer is selected based on the occupancy of the buffers. Abali discloses a switching system wherein each switch has route control logic that selects an unused output port from the set of possible outputs (col. 5, lines 43-53). At the time the invention was made it would have been obvious to use this routing feature of Abali in the switching system of Fan. One of ordinary skill in the art would have been motivated to do this in order to prevent congestion at a switching element.

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Conclusion

15. **THIS ACTION IS MADE FINAL.** Applicant is reminded of the extension of time policy as set forth in 37 CFR 1.136(a).

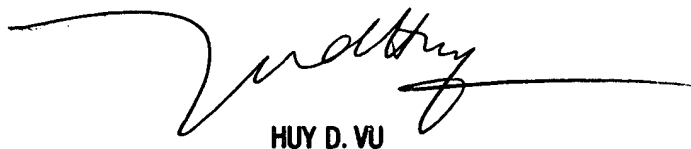
A shortened statutory period for reply to this final action is set to expire **THREE MONTHS** from the mailing date of this action. In the event a first reply is filed within **TWO MONTHS** of the mailing date of this final action and the advisory action is not mailed until after the end of the **THREE-MONTH** shortened statutory period, then the shortened statutory period will expire on the date the advisory action is mailed, and any extension fee pursuant to 37 CFR 1.136(a) will be calculated from the mailing date of the advisory action. In no event, however, will the statutory period for reply expire later than **SIX MONTHS** from the mailing date of this final action.

16. Any inquiry concerning this communication, or earlier communications from the examiner should be directed to Thomas Volper whose telephone number is 703-305-8405 and fax number is 703-746-9467. The examiner can normally be reached between 8:30am and 6:00pm M-F.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Huy Vu, can be reached at 703-308-6602. Any inquiry of a general nature or relating to the status of this application or proceeding should be directed to the receptionist whose telephone number is 703-305-4750.

tev

September 5, 2003



HUY D. VU
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